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SENATE

REPORT
101-350

GROUND WATER RESEARCH AND EDUCATION ACT OF 1990

JUNE 28 (legislative day, JUNE 11), 1990.—Ordered to be printed

Mr. BURDICK, from the Committee on Environment and Public Works, submitted the following

REPORT

[To accompany S. 203]

The Committee on Environment and Public Works, to which was referred the bill (S. 203) to authorize research into ground water contamination and remediation, and for other purposes, having considered the same, reports favorably thereon with amendments and recommends that the bill as amended do pass.

GENERAL STATEMENT

VALUE OF GROUND WATER

Ground water—water drawn from underground formations called aquifers—is a natural resource of outstanding value and importance. Ground water currently provides nearly one-fourth of the Nation's fresh water consumption.

The major use of ground water is for agricultural irrigation, which accounts for about 80 percent of the ground water withdrawn. But ground water is also used extensively for drinking water. Indeed, almost all rural households (97 percent) and nearly half the total U.S. population, use ground water as the source of drinking water. Ground water also supplies about one-fourth of the water used by industry. In addition, ground water supports ecosystems valued for fish production, wildlife, and recreational opportunities.

According to the General Accounting Office (GAO), the use of ground water is increasing at a faster rate than the use of surface water. The United States used 34 billion gallons of ground water

per day in 1950. In 1980 that figure almost tripled to 89 billion gallons of ground water each day.

SERIOUSNESS OF GROUND WATER CONTAMINATION

There is clear evidence from a number of major, national studies that ground water quality is threatened from a wide range of pollution sources and contaminants.

In 1984, the Office of Technology Assessment (OTA) conducted a major study of ground water contamination problems titled "Protecting the Nation's Ground Water from Contamination." The study concluded—

> Although only a small portion of the Nation's total ground water resource is thought to be contaminated, the potential effects of this contamination are significant and warrant national attention.

That same year, the Environmental Protection Agency (EPA) reported as part of its *Ground Water Strategy* that—

> Virtually every State in the Nation has detected ground water contamination affecting use, and monitoring efforts currently underway are expected to identify many more problems. . . . Sufficient information is avaliable to raise concerns that a widespread problem may exist.

A 1985 report by the National Ground Water Policy Forum, titled *Ground Water: Saving the Unseen Resource,* which included representatives of major industries, States and academia, concluded—

> Most ground water supplies in the United States are of good quality. The nation is not yet facing a ground water crisis. In some localities, however, contamination has caused well closures, public health concerns, and economic losses. These problems could spread. The challenge is to prevent these threats from creating a crisis.

SOURCES OF GROUND WATER CONTAMINATION

The sources of ground water contamination are diverse.

Wastes disposed of on land can percolate through the soil, introducing toxic chemicals and other contaminants into the aquifer. The widespread use of land disposal practices, including surface impoundments, septic systems, landfills, uncontrolled hazardous waste sites, and underground injection wells, poses a significant risk of ground water contamination.

1. *Surface Impoundments.*—EPA has identified over 180,000 liquid waste impoundments across the country, receiving an estimated 82 billion gallons per day of non-hazardous and hazardous wastes.

EPA estimated that fully 93 percent of the impoundments surveyed had an intermediate or high potential to contaminate ground water. The OTA concluded that "many impoundments are located near concentrations of people, and almost 87 percent are located over aquifers currently used as a source of drinking water."

2. *Septic Systems.*—There are approximately 22 million residential septic systems in the U.S., serving one-third of the population. The EPA reports that "septic systems represent the longest reported cause of ground water contamination resulting in disease outbreaks in the United States." OTA estimates that these systems receive between 826 and 1460 billion gallons per year of domestic wastewater.

Ground water contamination from septic systems has been reported in California, Massachusetts, New York, Florida, Delaware and Connecticut. In addition to contaminating ground water with nitrates and biological pathogens, such systems also can introduce toxic chemicals which have been dumped down the drain.

3. *Landfills.*—There are an estimated 75,000 industrial and 20,000 municipal solid waste landfills in the United States. OTA estimates that roughly 140 million tons of solid waste are generated each year, and between 40 and 140 million wet tons of non-hazardous industrial solid waste a year.

Many municipal landfills also contain significant quantities of household hazardous waste.

4. *Uncontrolled Hazardous Waste Sites.*—In 1986, EPA estimated that there were over 25,000 uncontrolled hazardous waste sites in the country; there are currently 1,218 sites on the National Priorities List (NPL) of the Superfund program. EPA has documented ground water contamination at 75 percent of the NPL sites.

5. *Underground Injection Wells.*—Underground injection wells are used to inject wastes deep into the earth beneath usable ground water supplies. OTA reports that there are at least 40,000 non hazardous waste injection wells, as many as 140,000 oil industry related wells, and close to 100 hazardous waste injection wells.

While sound construction and design theoretically provide protection against ground water contamination, improper design, construction and operation have led to instances of serious ground water contamination.

Activities other than waste disposal practices can also contaminate ground water. Some of these major sources of contamination include leaking underground storage tanks and pipelines, agricultural practices, and other miscellaneous activities.

1. *Leaking Underground Tanks and Pipelines.*—OTA estimates that there are about 2.5 million underground storage tanks made of steel with a life expectancy of 15 to 20 years. As many as one-fourth to one-third of tanks containing petroleum or gasoline may be leaking, posing a potential threat to ground water.

2. *Agricultural Practices.*—Widespread use of pesticides and fertilizers have contributed to ground water contamination in many rural parts of the country.

Pesticide contamination of ground water is an especially serious problem. The U.S. Department of Agriculture has reported that the water supply used by 50 million Americans is at risk of contamination from pesticides used in agriculture. Some 767 counties in the United States have a combination of vul-

nerable ground water and moderate to high pesticide which together put the drinking water supply at risk. These counties occur in every region of the Nation.

Evidence of pesticide contamination comes from a number of States. In California, 57 pesticides were reported in ground water in 1985, contaminating 2,887 wells. Over half the 8,404 wells tested on Long Island were found to have traces of the insecticide aldicarb. In Minnesota, some 38 percent of wells tested showed evidence of pesticide contamination. Studies in Iowa show 25 percent of all ground water supplies contains some amount of pesticide.

In addition, irrigation practices can increase the salinity and metal concentrations of ground water, and animal wastes from livestock can increase concentrations of nitrates in ground water.

3. *Other Activities.*—Other sources of ground water contamination include oil and gas exploration, mining waste disposal, road deicing salts, and urban storm runoff.

NEED FOR GROUND WATER RESEARCH

Ground water research is divided among various Federal, State, and private agencies (including the Environmental Protection Agency (EPA), the U.S. and State Geological Surveys, the U.S. Department of Agriculture, and other organizations and institutions including the National Water Resources Research Institutes located in each State.

Scientists, ground water experts, and public officials generally agree that our present knowledge about ground water contamination is inadequate and that an expanded research effort is necessary to provide information needed to manage and protect ground water resources and to clean up contamination where it already exists.

In its 1984 Ground Water Strategy, the EPA concluded that—

> More factual information is needed to determine the actual extent and severity of the ground water contamination problem in the country. The nature and extent of ground water contamination should receive more attention from the Federal Government, particularly the EPA and the DOI.

The 1984 report by the Office of Technology Assessment gave a high priority to improving the Nation's ground water research program. The report cited several important research needs, including:

—"research on toxicology and the adverse health effects of contaminants that are being found in ground water . . .

—"research on less costly techniques for hydrologic investigations . . .

—"research on the behavior of individual contaminants in ground water . . .

—"opportunities and mechanisms for preventing contamination . . .

The final report of the National Ground Water Policy Forum reaffirmed the need for improved ground water research concluding—

> The success of ground water management policies depends upon an adequate base of knowledge. Yet information about ground water quality, and about the role of ground water in the hydrogeologic cycle, has lagged far behind our knowledge of water in the atmosphere and on the surface. The past two decades have seen increased spending for research applicable to ground water management, but we believe that substantially more information is needed.

The Environmental and Energy Study Institute similarly concluded that—

> State and local officials, environmental group representatives and industry spokesmen all see a critical need for better data, better ways to make that data available to those who need it, and better methods to interpret the data for and give advice to decision makers.

Reviewing EPA's ground water research program in 1985, the EPA's Independent Science Advisory Board (SAB) concluded that EPA's ground water research program was—

> inadequate to support the Ground Water Strategy or future regulatory and policy needs.

One of the SAB's major recommendations addressed the lack of an integrated ground water research program. The SAB recommended EPA's Office of Research and Development (ORD) "establish a strong central direction for its ground water research program, with appropriate authority for the program director." The SAB also recommended that EPA should:

—begin research on contamination sources not addressed by laws;
—establish a formal interagency research coordination effort;
—identify the pending ground water policy decisions and their research and information needs;
—increase overall funding for ground water research particularly in monitoring;
—increase work on the development of accurate sampling and analytical methods;
—increase research on the basic processes that govern transport and fate of contaminants; and
—develop a greatly expanded program to address these particular problems.

Description of Reported Bill

The Ground Water Research and Education Act of 1990 (S. 203) provides for a comprehensive and coordinated program of research to support the management and protection of ground water resources. The reported bill includes a number of amendments to S. 203 as introduced which generally streamline the bill and better focus it on research needs. The central objectives and provisions of the bill are explained below.

RESEARCH COORDINATION

A central objective of the reported bill is to assure coordination of the research activities conducted by the various agencies of the Federal Government, including the EPA, the U.S. Geological Survey (USGS), and the Department of Agriculture.

Title I of the reported bill establishes an Interagency Ground Water Research Task Force, made up of Federal agencies with a significant role in ground water research and chaired by the EPA. The Task Force, which is to report to Congress biennially, is to assure that the overall research program is capable of supporting major ground water policy decisions and to provide States with the information they need to develop and implement ground water programs.

The bill also establishes two committees to assist the Task Force. An Advisory Committee, made up of interested organizations, the private sector, and state and local governments, is to represent the views of these groups to the Task Force and the President. A Data Management Committee is to help assure that data management systems of the Federal government are coordinated and compatible.

STATE AND REGIONAL GROUND WATER RESEARCH NEEDS

Several provisions of the reported bill provide added support to State and regional ground water related research.

Section 105 of the bill reauthorizes the Water Resources Research Institutes located at land grant colleges in each State. The institutes conduct general water related research, but a substantial portion of this research is focused on ground water quantity and quality issues. This section of the bill provides increased funding for research of regional or interstate importance.

Section 210 of the reported bill authorizes creation of up to five regional ground water research institutes to address ground water research issues in the various ground water regions of the country.

Section 225 of the reported bill provides new authority for national laboratories to work with water resources research institutes and others on water resources and ground water research issues of national importance.

RESEARCH PROGRAM AUTHORIZATIONS

Title II of the reported bill provides general authority to the EPA, the USGS, and the Department of Agriculture for research related to ground water and ground water quality.

Section 201 indicates the range of EPA ground water research authorities. Section 202 establishes a research committee within the EPA to guide and oversee EPA ground water related research. A key objective of the research committee is to assure that the EPA research program is adequate to support upcoming policy decisions related to ground water.

Section 221 provides general authority for the Secretary of the Department of Interior, acting through the Geological Survey, to undertake basic and applied ground water research, to collect hydrologic data on surface and ground water quantity and quality, and to conduct local investigations and surveys of water resources.

This section also specifically authorizes the existing USGS/State cooperative program for water resources research.

Sections 231, 232 and 233 provide general authority, to the Secretary of Agriculture to establish a national research, development, and demonstration program on the impact of agricultural practices on ground water quality.

CONTROL TECHNOLOGIES

The reported bill gives special attention to the development of improved technologies for the assessment, protection, or remediation of ground water contamination.

Section 203 directs the EPA to provide grants to support the demonstration of new ground water related technologies and to conduct a program to transfer effective technologies to interested parties.

ASSESSMENT OF GROUND WATER CONTAMINANTS

A number of recent studies and reports have identified a need for reliable and complete information on the range of contaminants in ground water and the health effect of these contaminants.

The Office of Technology Assessment report concluded that—

> Although contamination problems require site specific judgements, they nevertheless have common features that are amenable to development of Federal criteria or guidelines.

At the request of the Committee on Environment and Public Works, GAO completed in February and March of 1988, studies on States' management of ground water. In responding to GAO, States reported that information from the Federal Government concerning ground water contaminants is inadequate. GAO concluded that States usually do not perform original research on toxicology or on health risk posed by ground water contaminants; instead they rely upon the Federal Government.

Section 204 of the reported bill provides for development of a list of ground water contaminants. The EPA and the Director of the National Toxicology Program are to develop a research plan for these contaminants which supplements existing research and assures that a health assessment can be developed for the contaminant.

Section 205 of the reported bill provides for the development of health assessment documents. Health assessments are to provide States and other interested parties with a full range of information on the contaminant and on efforts to control the contaminant.

GROUND WATER INVENTORY AND ASSESSMENT

Several provisions of the reported bill will contribute to an improved understanding of the location of ground water and the seriousness of ground water contamination.

Section 22 directs the USGS to prepare a national ground water quality inventory and assessment based on existing information within one year of the date of enactment of this Act. Section 223 provides standing authority to the USGS to carry out a national

ground water assessment and monitoring program on an ongoing basis.

Section 206 provides for the EPA to conduct a series of studies of specific sources of ground water contamination, including the contribution of these sources to overall contamination and the effectiveness of various control strategies.

SPECIAL STUDIES OF GROUND WATER ISSUES

The reported bill calls for several special studies of ground water quality issues. These studies are to address abandoned wells, the health effects of nitrates, ground water impacts of agricultural drainage wells, and the efficient use of nutrients.

SECTION-BY-SECTION ANALYSIS

SECTION 1. SHORT TITLE

This Act may be cited as the Ground Water Research and Education Act.

SECTION 2. FINDINGS

The findings identify the seriousness and extent of ground water pollution and indicate the need for an expanded and strengthened ground water research program.

The Committee deleted several findings included in the original bill, including a finding identifying State governments as primarily responsible for ground water protection. In deletion of this finding, the Committee intended to conform the findings section of the bill with revisions to other parts of the bill, including the deletion of the original title III, which would have provided substantial assistance to State ground water protection programs. The deletion of the finding and title III were intended to focus the reported bill on ground water research, rather than protection, issues. The Committee may address the relative roles of Federal, State, and local governments in protecting ground water in subsequent legislation.

SECTION 3. DEFINITIONS

Key terms are defined in this section.

TITLE I—COORDINATION OF FEDERAL GROUND WATER RESEARCH AND EDUCATION PROGRAMS

SECTION 101—INTERAGENCY GROUND WATER RESEARCH TASK FORCE

This provides the President with authority to coordinate the ground water research activities of the Federal Government and establishes an interagency Ground Water Research Task Force.

The Task Force is to be made up of Key Federal agencies involved in ground water research and is to be chaired by the Administrator of the EPA. The Task Force is to identify research data needs, recommend research priorities, facilitate interagency coordination, and consult with State and local governments concerning ground water research needs.

The Task Force is to submit a biennial report to Congress which is to serve as a management plan for Federal Government research

of ground water and is to identify ground water policy issues on which research is needed. Each participating agency is to submit a research plan to the Task Force on a biennial basis.

SECTION 102—ADVISORY COMMITTEE

This section establishes an Advisory Committee on Ground Water Research to advise the President and the Interagency Task Force on ground water research issues and needs. The Advisory Committee is to be made up of not more than 15 individuals representing States and local government, environmental organizations, industry, and other groups. At least five members of the committee will represent State or local governments.

SECTION 103—GROUND WATER DATA MANAGEMENT COMMITTEE

This section provides for establishment of a Committee to assure coordination of data and information systems relating to ground water. This Committee is to make recommendations for improving ground water data management in a report within two years of the date of enactment.

SECTION 104—AUTHORIZATIONS

There is authorized to be appropriated $2 million for implementation of sections 102 and 103, for fiscal years 1991 through 1995.

SECTION 105—WATER RESEARCH INSTITUTES

This section amends P.L. 98-242, which reauthorizes a broad research program in water resources, including quantity and quality issues, for 54 Water Research Institutes established in each State and territory.

Key provisions of this section would extend the core grant program for the water resources institutes through 1995, decrease funding for research in the national interest from $20 million to $10 million while extending the authorization through 1995, establish a new grant program for issues of a regional nature at a funding level of $5 million per year through 1995, and revise and extend the program for development of water resources research technology.

TITLE II—GROUND WATER RESEARCH PROGRAMS OF THE FEDERAL GOVERNMENT

PART A—PROGRAMS OF ENVIRONMENTAL PROTECTION AGENCY

SECTION 201—AUTHORITY

This section establishes a general ground water research program at the Environmental Protection Agency. The Administrator is given general authorities to conduct research, cooperate with others doing research, make grants, enter into contracts, acquire patents and so on.

Six priorities are established for the research program:

1. fate and transport of contaminants;
2. control technologies for sources;

3. health and environmental effects of ground water contaminants;

4. analytical procedures for ground water monitoring;

5. remediation and treatment of contaminated ground water; and

6. waste minimization.

Twenty-two specific areas of investigation are listed including: health and environmental effects of contaminants; exposure assessment; hydrogeologic studies; transport and fate of contaminants; analytical methods; control of discharges; and remediation and treatment.

SECTION 202—RESEARCH COMMITTEE AND MANAGEMENT PLAN

Research programs at EPA are generally monitored and guided by media-specific research committees. There are currently five such committees (air, waste, water, energy and toxics). This section adds a sixth group for ground water research. The group is to be jointly chaired by the Office of Water and the Office of Research and Development. Members of the committee are drawn from offices within EPA.

The research committee is to issue a biennial report which is to be a five-year plan and which is to serve as the management plan for the ground water research program. The report is to include a list of upcoming ground water policy decisions and the research needs of the policymakers with respect to those decisions.

SECTION 203—CONTROL TECHNOLOGIES

This section requires EPA to establish a program to develop control technologies for sources of ground water contaminants in various categories.

EPA is to make an biennial solicitation for proposals. The legislation includes criteria for project selection including:

1. potential for the technology to effectively control sources of ground water contaminants;

2. the capability of the person proposing the demonstration to complete the project;

3. the applicability of the technology under a wide range of circumstances;

4. financial support from other source; and

5. the capability of the developer to disseminate the technology to the public.

Assistance is limited to 50 percent of the project cost, but the Administrator is authorized to provide full Federal funding for basic and essential research projects. EPA is required to make every effort to disseminate the control technologies proven effective.

SECTION 204—LIST OF CONTAMINANTS

This section requires EPA to prepare and update a list of ground water contaminants and to develop research programs for such contaminants.

The Director of the National Toxicology Program is to propose a research program for each of the contaminants listed which de-

scribes the research necessary to prepare a health assessment for the contaminant.

SECTION 205—GROUND WATER CONTAMINANT HEALTH ASSESSMENT

This section requires the Administrator to prepare health assessment documents for ground water contaminants. The health assessments are to include a description of recent scientific information about the contaminant, factors which contribute to the effects of the contaminant on human health and the environment; clarification of the assumptions and uncertainties in the science related to the contaminant; assessment of the association of contaminants with sources of ground water pollution, and a comparison with risks posed by other contaminants.

Health assessments are to be established for 30 contaminants within 24 months and an additional 30 contaminants within an additional 36 months.

SECTION 206—CONTAMINANT SOURCE SURVEYS

This section requires the Administrator to conduct a series of surveys of major sources of ground water contamination similar to the National Pesticide Survey. The purpose of the surveys is to determine the extant seriousness of ground water pollution from these sources.

The source categories to be covered by the surveys include septic tanks and cesspools; landfills, surface impoundments and wastepiles; class V injection wells; fertilizer applications; irrigation return flows; POTWs; light industry; and transportation corridors. Governors may petition EPA to add categories to this list.

SECTION 207—STUDY OF HEALTH EFFECTS OF NITRATES AND NITROSAMINES

This section authorizes a study of the health effects of nitrates (a widespread ground water contaminant) and nitrosamines (a metabolite of nitrates thought to be carcinogenic).

SECTION 208—STUDY OF ABANDONED WELLS

This section authorizes a study, to be completed by September 1, 1991, of abandoned production and injection wells, including former drinking water wells, and the impact of abandoned wells on ground water quality. The study is to include recommendations on the most cost effective steps which can be taken to assure that further damage to ground water by abandoned wells is prevented. A key purpose of the study is to examine the options available for preventing further degradation including reqirements that wells be capped on a specific schedule.

SECTION 209—ADDITIONAL PROVISIONS

This section provides requirements for peer review and authorities for facilities management.

SECTION 210—GROUND WATER RESEARCH INSTITUTES

This section authorizes EPA to establish and provide grant assistance to five regional ground water research institutes at universities across the country. The legislation provides criteria for selecting the locations of the institutes. Federal funding is limited to 50 percent of the research program.

The institutes should be located, when possible, in areas that include diverse climatic and geologic features in order to reflect the diversity of national ground water resources. For example, consideration should be given a location in a glaciated, nonmountainous northern plains state which includes significant glacial lake, glacial plain, prairie coteau and nonglaciated dryland farming areas. Such a location should also have climatic variables representative of all the biomes of the Northern Great Plains. In addition, an institute should be located, in the arid southwest region of the country which is heavily dependent on limited ground water quality supplies.

SECTION 211—ASSISTANCE FOR SMALL COMMUNITIES WITH GROUND WATER RADIUM CONTAMINATION

This section provides for financial assistance to small communities for removal of the contaminant radium from public drinking water supplies. This provisions does not affect any existing standard with relation to drinking water quality.

SECTION 212—AUTHORIZATION OF APPROPRIATIONS

A total of $73 million is authorized to be appropriated for implementation of this part for each of fiscal years 1991 through 1995.

PART B—PROGRAMS OF THE DEPARTMENT OF THE INTERIOR

SECTION 221—AUTHORITY

Authorizes a ground water research program within the U.S. Geological Survey. This program builds on an existing research program at the Geological Survey that includes studies of both surface water and ground water. The current authorization is increased by $10 million in this section to $160 million total.

SECTION 222—GROUND WATER INVENTORY REPORT

This section directs the United States Geological Survey to prepare an inventory of the ground water resources based on existing data, and an evaluation of the adequacy of existing ground water data collection and monitoring programs conducted by the Federal, State, and local governments. The report for this section is required to be submitted to Congress with 30 months of the date of enactment of this Act.

SECTION 223—NATIONAL ASSESSMENT OF GROUND WATER QUALITY

This section authorizes the United States Geological Survey to develop an assessment of the ground water quality. The assessment is to be based on a nationwide sampling and monitoring program

and to identify changes and trends in the nation's ground water quantity and quality.

SECTION 224—AUTHORITIES OF THE ADMINISTRATOR

This section states that nothing in this part shall limit the authorities of the Administrator or other head of any Federal agency.

SECTION 225—GROUND WATER RESEARCH INSTITUTES

This section authorizes the Secretary to support ground water research at national labortories.

SECTION 226—AUTHORIZATIONS

A total of $180 million is authorized for the implementation of this part.

PART C—GROUND WATER RESEARCH PROGRAM OF THE DEPARTMENT OF AGRICULTURE

SECTION 231—GENERAL AUTHORITY

This section authorizes the Secretary of Agriculture to develop a research program with the participation of the Agricultural Research Service and the Cooperative State Research Service and other entities.

SECTION 232—EVALUATION

The Secretary is to prepare reports to Congress which shall include an evaluation of the current program and recommendations for improvements.

SECTION 233—AGRICULTURAL RESEARCH PROGRAM

This section defines the agricultural research program to be conducted by the Agricultural Research Service and the Cooperative State Research Service relating to ground water quality.

SECTION 234—AGRICULTURAL NITROGEN BEST MANAGEMENT PRACTICES

This section provides for the establishment of a Nitrogen Best Practices Committee to develop a study and education program on best management practices to minimize the impact of agricultural nitrogen on ground water quality.

SECTION 235—EFFICIENT USE OF NUTRIENTS

This section directs the Secretary of Agriculture to conduct research on practices, methods, and techniques for improving the efficiency of fertilizer uses in agriculture.

SECTION 236—AGRICULTURAL DRAINAGE WELL STUDY

This section authorizes a study of agricultural draining wells and their impact on ground water quality, and includes a provision for the study of alternative drainage methods.

SECTION 237—TRAINING PROGRM

This section directs the Secretary of Agriculture to establish a public education program for the dissemination of information to farmers and rural residents, and a training program for professionals and technicians in issues related to agricultural practices, methods, alternatives and the ground water quality.

PART D—ADDITIONAL PROVISIONS

SECTION 241—LAKE OKEECHOBEE ECOSYSTEM RESEARCH SYSTEM

This section directs the Administrator, in cooperation with the Secretary of the Army, to study the relationship between surface and ground waters and the control of aquatic plants. Authorizations of $2.5 million are provided over 3 years.

SECTION 242—WESTERN CENTER FOR NUCLEAR AND GROUND WATER RESEARCH

This section establishes a Western Center for Nuclear and Ground Water Research within Nevada to evaluate the potential for leaching of radionuclides and the migration of these contaminants in ground water in an arid climate. The Center shall review existing an proposed programs and projects relating to containment of radioactive waste. This center is not to function as a general ground water research center for the southwest region of the Nation.

HEARINGS

The Environment and Public Works Committee has held twenty days of hearings on ground water related issues in the 98th, 99th, 100th and 101st Congresses.

In the 100th Congress, the Subcommittees on Water Resources, Transportation and Infrastructure and Hazardous Wastes and Toxic Substances held three days of joint hearings on ground water legislation, including S. 1105 (which was reintroduced as S. 203 in the 101st Congress). These hearings were held in Washington, DC on February 28, March 24, and May 17, 1988. Witnesses at the hearings included representatives of Federal agencies, professional organizations, interest groups, business groups, States and local governments, and others (See Senate Report 100-661.)

In the 101st Congress, the Subcommittee on Superfund, Ocean and Water Protection held a hearing on general ground water policy issues, including ground water research issues, on August 1 of 1989. Witnesses at the hearing included representatives of the EPA, the United States Geological Survey, the Department of Agriculture, State agencies, and industry and environmental groups (see Senate Report 101-220).

ROLLCALL VOTES

Section 7(b) of rule XXVI of the Standing Rules of the Senate and the rules of the Committee on Environment and Public Works require that any rollcall votes taken during consideration of this bill be announced in this report.

On June 12, 1990, the bill as amended was ordered reported unanimously by a voice vote. During consideration of the bill, Senator Symms offered an amendment to add to the bill a finding establishing a priority role for State and local governments in ground water protection. The amendment was defeated by a rollcall vote of 6 yeas and 10 nays.

Regulatory Impact

In compliance with section 11(b) of rule XXVI of the Standing Rules of the Senate, the Committee makes the following evaluation of the regulatory impact of the reported bill: It is not expected that there will be any new regulatory burdens created by the reported bill.

Cost of Legislation

Section 403 of the Congressional Budget and Impoundment Control Act requires each bill to contain a statement of the cost of such bill prepared by the Congressional Budget Office. That report follows:

U.S. Congress,
Congressional Budget Office,
Washington, DC, June 25, 1990.

Hon. Quentin N. Burdick,
Chairman, Committee on Environment and Public Works, U.S. Senate, Washington, DC.

Dear Mr. Chairman: The Congressional Budget Office has prepared the attached cost estimate for S. 203, the Ground Water Research and Education Act of 1990.

If you wish further details on this estimate, we will be pleased to provide them.

Sincerely,

Robert D. Reischauer,
Director.

Congressional Budget Office Cost Estimate

1. Bill number: S. 203.

2. Bill title: Ground Water Research and Education Act of 1990.

3. Bill status: As ordered reported by the Senate Committee on Environment and Public Works, June 12, 1990.

4. Bill purpose: S. 203 would authorize activities related to nations groundwater resources. Title I would authorize appropriations to the Secretary of the Interior for management of groundwater data and coordination of federal groundwater research.

Title II would provide general authorizations for federal groundwater research programs at the Environmental Protection Agency (EPA), the U.S. Geological Survey (USGS), and the U.S. Department of Agriculture (USDA). Title II would also require the EPA to conduct specific groundwater research programs in Florida and Nevada.

5. Estimated cost to the Federal Government:

[By fiscal year, in millions of dollars]

	1991	1992	1993	1994	1995
Title I:					
Authorization Level	33	33	33	33	33
Estimated Outlays	31	33	33	33	33
Title II:					
Authorization Level:					
Specific	291	288	288	283	283
Estimated	6	6	6	6	6
Total	297	294	294	289	289
Estimated Outlays	233	273	286	289	290
Total, S. 203:					
Authorization Level	330	327	327	322	322
Estimated Outlays	264	306	319	322	323

The costs of this bill would be in budget functions 300 and 350.

Basis of Estimate: The specific authorizations shown in the table are as stated in the bill. This estimate assumes that the full amounts authorized would be appropriated for each fiscal year. The estimated outlays are based on historical spending patterns.

The estimated authorization level shown for Title II includes $1 million annually for the EPA's assistance to the Western Center for Nuclear and Groundwater Research (authorized by section 242) and $5 million annually for the agricultural nitrogen research program authorized by section 234. No amounts were included for the abandoned well study required by section 208 because we expect that this study could be completed at no significant additional cost to the government.

6. Estimated cost to State and local governments: Many of the programs authorized by this bill would fund grants and technical assistance for state and local governments. Of the total amount authorized, $20 million to $30 million annually would be for these types of programs. The grant programs would require a matching contribution from the recipient.

7. Estimate comparison: None.

8. Previous CBO estimate: None.

9. Estimate prepared by: Michael Sieverts, Kim Cawley, and David Hull.

10. Estimate approved by: C.G. Nuckols, for James L. Blum, Assistant Director for Budget Analysis.

Changes in Existing Law

In compliance with section 12 of rule XXVI of the Standing Rules of the Senate, changes in existing law made by the bill as reported are shown as follows: Existing law proposed to be omitted is enclosed in black brackets, new matter is printed in italic, existing law in which no change is proposed is shown in roman:

PUBLIC LAW 98-242—WATER RESOURCES RESEARCH ACT OF 1984

AN ACT To authorize an ongoing program of water resources research, and for other purposes

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SEC. 103. It is the purpose of this Act to assist the Nation and the States in augmenting their water resources science and technology as a way to—

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(5) [coordinate more effectively] *to promote more effective coordination of* the Nation's water resources research program; and

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SEC. 104. (a) Subject to the approval of the Secretary of the Interior (hereafter in this Act referred to as the "Secretary") under this section, one water resources research and technology institute, center, or equivalent agency (hereafter in this Act referred to as the "institute") may be established in each State (as used in this Act, the term "State" includes the Commonwealth of Puerto Rico, the District of Columbia, the Virgin Islands, Guam, American Samoa, the Commonwealth of the Mariana Islands and the [Trust Territory of the Pacific Islands] *Federated States of Micronesia* at a college or university which was established in accordance with the Act approved July 2, 1862 (12 Stat. 503; 7 U.S.C. 301ff), entitled "An Act donating public lands to the several States and territories which may provide colleges for the benefit of agriculture and the mechanic arts" or at some other institution designated by act of the legislature of the State concerned. If there is more than one such college or university in a State established in accordance with such Act of July 2, 1862, the institute in such State shall, in the absence of a designation to the contrary by act of the legislature of the State, be established at the one such college or university designated by the Governor of the State. Two or more States may cooperate in the establishment of a single institute or regional institute, in which even the sums otherwise allocated to institutes in each of the cooperating States shall be paid to such single or regional institute.

(b) Each institute shall—

[(1) plan, conduct, or otherwise arrange for competent research with respect to water resources, including investigations and experiments of either a basic or practical nature, or both; promote the dissemination and application of the results of these efforts; and provide for the training of scientists and engineers through such research, investigations, and experiments, and]

(1) plan, conduct, or otherwise arrange for competent research that fosters (A) the entry of new research scientists into the water resources fields, (B) the training and education of future water scientists, engineers, and technicians, (C) the preliminary exploration of new ideas that address water problems or expand

understanding of water and water-related phenomena, and (D) the dissemination of research results to water managers and the public, and

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(c) From the sums appropriated pursuant to subsection (f) of this section, the Secretary shall make grants to each institute to be matched on a basis of no less than one non-Federal dollar for every Federal dollar during the fiscal years ending September 30, 1985, and September 30, 1986, one and one-half non-Federal dollars for each Federal dollar during the fiscal years ending September 30, 1987, and September 30, 1988, and two non-Federal dollars for each Federal dollar during the fiscal year ending September 30, 1989[.] *and thereafter such sums to be used only for the reimbursement of the direct cost expenditures incurred for the conduct of the water resources research program.*

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[(e)(1) The Secretary shall establish procedures for a careful and detailed evaluation of each institute to determine that the quality and relevance of its water resources research and its effectiveness as an institution for planning, conducting and arranging for research warrants its continued support under this section in the national interest. The evaluation of each institute shall be made by a team of knowledgeable individuals including employees of the Department of the Interior, university faculty or administrators, water research institute directors from other institutes, State or local water resource agency personnel, and private citizens selected for this purpose. The Secretary may also secure the cooperation of the National Research Council/National Academy of Science. The evaluation team shall visit the institute and shall assess the scientific quality of its research program, the potential effectiveness of its research in meeting water resource needs, and the demonstrated performance in making research results available to users in the State and elsewhere. Criteria for making the determination that an institute is an effective instrument for water resources research shall include the following: accreditation in sufficient disciplines to successfully mount a multidisciplinary research program; sufficient resources, including laboratory, library, computer, and support facilities; a sufficiently close administrative relation and physical proximity to the university and to all the parts of it needed to provide an effective working relationship with researchers in a wide range of disciplines; and institutional commitment to the support and continuation of an effective water research program.

[(2) The Secretary shall arrange for each of the institutes supported under this section to be evaluated under this subsection within two years after its establishment and to be reevaluated at intervals not to exceed four years. If, as a result of any such evaluation, the Secretary determines that an institute does not qualify for further support under this section, then no further grants to the institute may be made until the institute's qualification is reestablished to the satisfaction of the Secretary.]

(e) The Secretary shall conduct a careful and detailed evaluation of each institute at least once every 5 years to determine that the quality and relevance of its water resources research and its effectiveness as an institution for planning, conducting, and arranging for research warrants its continued support under this section. If, as a result of any such evaluation, the Secretary determines that an institute does not qualify for further support under this section, then no further grants to the institute may be made until the institute's qualifications are reestablished to the satisfaction of the Secretary.

(f)(1) For the purpose of carrying out this section, there is authorized to be appropriated to the Secretary the sum of $10,000,000 for each of the fiscal years ending [September 30, 1985, through September 30, 1989,] *September 30, 1989 through September 30, 1995,* such sums to remain available until expended.

(2) Any sums appropriated under this subsection but which fail to be obligated by the close of the fiscal year for which they were appropriated shall be transferred by the Secretary and available for obligation during the succeeding fiscal year under the terms of [section 106 of this Act.] *Section 105 of this Act.*

(g)(1) There is further authorized to be appropriated to the Secretary of the Interior the sum of $5,000,000 for each of the fiscal years 1991, 1992, 1993, 1994, and 1995 only for reimbursement of the direct cost expenses of additional research or synthesis of the results of research by institutes which focuses on water problems and issues of a regional or interstate nature beyond those of concern only to a single State and which relate to specific program priorities identified jointly by the Secretary and the institutes. Such funds when appropriated shall be matched on a not less than dollar-for-dollar basis by funds made available to institutes or groups of institutes, by States or other non-Federal sources. Funds made available under this subsection shall remain available until expended.

(2) Research funds made available under this subsection shall be made on a competitive basis subject to the merit of the proposal, the need for the information to be produced, and the opportunity such funds will provide for training of water resources scientists or professionals.

SEC. 105. (a)(1) * * *

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[(3) In cases where the Secretary determines, in accordance with criteria established by him, that research under this section is of a basic nature which would not otherwise be undertaken, the Secretary may approve grants under this section with a matching requirement other than that specified in paragraph (1) of this subsection.]

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(c) There is authorized to be appropriated to the Secretary the sum of [$20,000,000] *$10,000,000* for the purpose of carrying out this section for each of the fiscal years ending September 30, 1985 through September 30, [1989,] *1995,* such sums to remain available until expended.

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[SEC. 106. (a)(1) The Secretary shall make grants or contracts in addition to those authorized under sections 104 and 105 to educational institutions, private firms, private foundations, individuals, and agencies of local or State governments for technology development concerning any aspect of water-related technology which the Secretary may deem to be of State, regional, and national importance, including technology associated with improvement of waters of impaired quality and the operation of test facilties. Such grants or contracts shall be made on the basis of the merit and feasibility of the project based on expert evaluation as deemed appropriate by the Secretary, taking care to protect proprietary information of private firms or individuals associated with the technology.

[(2) The Secretary may establish any condition for the matching of funds by the recipient of any grant or contract under this section which the Secretary considers to be in the best interest of the Nation considering the technology needs for water resources in the Nation.

[(b) Each application for a grant or contract under this section shall state the nature of the project to be undertaken, the qualifications of the personnel who will direct and conduct it, the facilities of the organization performing the technology development, the importance of the project to the Nation, region, and State concerned, and the potential benefit to be accrued from the development.

[(c)(1) There is authorized to be appropriated to the Secretary the sum of $6,000,000 for the purpose of carrying out this section for each of the fiscal years ending September 30, 1985, through September 30, 1989, such sums to remain available until expended.

[(2) In addition to sums available under the terms of paragraph (1) of this subsection, the Secretary is also authorized to obligate funds under this section if such funds are transferred under the terms of section 104(f)(2) of this Act.]

SEC. 106. (a)(1) The Secretary shall make grants in addition to those authorized under sections 104 and 105 for technology development concerning any aspect of water resources including water-related technology which the Secretary may deem to be State, regional, or national importance. Activities funded under this section may be carried out by educational institutions, private firms, foundations, individuals, or agencies of State or local government. Care shall be taken to protect proprietary information of private individuals or firms associated with the technology.

(2) The Secretary may establish any condition for the matching of funds by the recipient of any grant or contract under this section which the Secretary considers to be in the best interest of the Nation considering the information transfer and technology needs of the Nation. However, in the case of institutes by section 104 of this Act no match greater than that required under section 104 may be required.

(b) Each application for a grant under this section shall state that nature of the project to be undertaken, the qualifications of the personnel who will direct and conduct it, facilities of the organization performing any technology development, the importance of the project to the Nation, region, and State concerned, and the potential benefit to be accrued.

(c) There is authorized to be appropriated to the Secretary the sum of $6,000,000 for the purpose of carrying out this section for each of the fiscal years ending September 30, 1990, through September 30, 1995; such sums to remain available until expended.

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SEC. 108. The type of research and development to be undertaken under the authority of sections 105 and 106 of this Act and to be encouraged by the institutes established under section 104 of this Act shall include the following:

(1) Aspects of the hydrologic cycle;

(2) Supply and demand for water;

(3) Demineralization of saline and other impaired waters;

(4) Conservation and best use of available supplies of water and methods of increasing such supplies;

(5) Water reuse;

(6) Depletion, *contamination,* and degradation of groundwater supplies;

(7) Improvements in the productivity of water when used for agricultural, municipal, and commercial purposes;

(8) The economic, legal, engineering, social, recreational, biological, geographic, ecological, and other aspects of water *quality and quantity* problems;

(9) Scientific information dissemination activities, including identifying, assembling, and interpreting the results of scientific and engineering research on water resources problems; and

(10) Providing means for improved communications of research results, having due regard for the varying conditions and needs for the respective States and regions.

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